

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

## PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY  
(PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/RU2004/000037

International filing date (day/month/year)  
05.02.2004

Priority date (day/month/year)

International Patent Classification (IPC) or both national classification and IPC  
H04L25/02

Applicant

ZAKRYTOE AKTSIONERNOE OBSHCHESTVO INTEL

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/RU2004/000037

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**Box No. I Basis of the opinion**

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1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:
    - ☐ a sequence listing
    - ☐ table(s) related to the sequence listing
  - b. format of material:
    - ☐ in written format
    - ☐ in computer readable form
  - c. time of filing/furnishing:
    - ☐ contained in the international application as filed.
    - ☐ filed together with the international application in computer readable form.
    - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

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**Box No. II Priority**

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1. ☒ The following document has not been furnished:

- ☒ copy of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(a)).  
☐ translation of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. ☐ It has not been possible to consider the validity of the priority claim because a copy of the priority document was not available to the ISA at the time that the search was conducted (Rule 17.1). This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.
4. Additional observations, if necessary:

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**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	1-21
	No: Claims	
Inventive step (IS)	Yes: Claims	2-7, 9-14, 16-21
	No: Claims	1,8,15
Industrial applicability (IA)	Yes: Claims	1-21
	No: Claims	

2. Citations and explanations

see separate sheet

**Re Item V.**

- 1 The following documents are referred to in this communication:  
D1 : US 5 293 401 A (SERFATY SALOMON) 8 March 1994 (1994-03-08)  
D2 : US 2003/147476 A1 (KOBAYASHI HISASHI ET AL) 7 August 2003 (2003-08-07)
- 2 Document D1 discloses (the references in parenthesis applying to this document):  
A method to perform channel estimation, comprising:  
receiving a first training sequence (col. 1, line 56);  
estimating a channel impulse response using said first  
received training sequence (col. 1, lines 56-57);  
receiving a second training sequence (col. 1, line 60); and  
estimating at least one channel impulse response estimate using said  
second received training sequence (col. 1, lines 61-65).

**2.1 INDEPENDENT CLAIM 1**

- 2.1.1 Document D1, which is considered to represent the most relevant state of the art, discloses a method from which the subject-matter of independent claim 1 differs in that:  
"a maximum likelihood estimate" of the channel impulse response is used in estimating the channel.
- 2.1.2 Since this method of estimating a channel impulse response is one from a number of equally likely alternatives, an example of which is demonstrated in D2, and does not have any stated advantages, it would be an obvious design choice for the person skilled in the art. Thus claim 1 cannot be considered inventive (Article 33(3) PCT).
- 2.2 A similar argument applies to the corresponding independent apparatus claims 8 and 15.

**WRITTEN OPINION OF THE  
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AUTHORITY (SEPARATE SHEET)**

International application No.

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**3 DEPENDENT CLAIMS 2-7, 9-14, 16-21**

The combination of the features of dependent claims 2-7, 9-14, 16-21 are neither known from, nor rendered obvious by, the available prior art. The reasons are as follows:

The methods and systems for channel estimation in a communication system described in the above mentioned claims appear to be novel and inventive.